

## Abstract of the Disclosure

A method quantizes an input signal of  $N$  samples into a string of  $k$  symbols drawn from a  $q$ -ary alphabet. A complementary method reproduces a minimally distorted version of the input signal from the quantized string, given some distortion measure. First, an  $[N, k]_q$  linear error-correcting code that has a sparse generator factor graph representation is selected. A fixed mapping from  $q$ -ary symbols to samples is selected. A soft-input decoder and an encoder for the SGFG codes is selected. A cost function is determined from the input signal and a distortion measure, using the fixed mapping. The decoder determines an information block corresponding to a code word of the SGFG code with a low cost for the input signal. The input signal can be reproduced using the encoder for the SGFG code, in combination with the fixed mapping.